Test Definition: WEEP

Western Equine Encephalitis Antibody, IgG and IgM, Serum

Overview

Useful For
Aiding the diagnosis of Western equine encephalitis using serum specimens

Testing Algorithm
For more information see Mosquito-borne Disease Laboratory Testing

Special Instructions
- Mosquito-borne Disease Laboratory Testing

Method Name
Immunofluorescence Assay (IFA)

NY State Available
Yes

Specimen

Specimen Type
Serum

Specimen Required
Supplies: Sarstedt Aliquot Tube 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 0.5 mL
Collection Instructions: Centrifuge and aliquot serum into plastic vial.

Forms
If not ordering electronically, complete, print, and send Infectious Disease Serology Test Request (T916) with the specimen.

Specimen Minimum Volume
0.15 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	14 days	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information

The virus that causes Western equine encephalitis (WEE) is widely distributed throughout the United States and Canada; disease occurs almost exclusively in the western states and Canadian provinces. The relative absence of the disease in the eastern United States probably reflects a paucity of the vector mosquito species, *Culex tarsalis*, and possibly a lower pathogenicity of local virus strains.

The disease usually begins suddenly with malaise, fever, and headache, often with nausea and vomiting. Vertigo, photophobia, sore throat, respiratory symptoms, abdominal pain, and myalgia are also common. Over a few days, the headache intensifies; drowsiness and restlessness may merge into a coma in severe cases. In infants and children, the onset may be more abrupt than for adults. WEE should be suspected in any case of febrile central nervous system (CNS) disease from an endemic area. Infants are highly susceptible to CNS disease and about 20% of cases are patients under 1 year of age. There is an excess of male patients with WEE clinical encephalitis, averaging about twice the number of infections detected in female patients. After recovery from acute disease, patients may require from several months to 2 years to overcome the fatigue, headache, and irritability. Infants and children are at higher risk of permanent brain damage after recovery than adults.

Infections with arboviruses can occur at any age. The age distribution depends on the degree of exposure to the particular transmitting arthropod relating to age, sex, and occupational, vocational, and recreational habits of the individuals. Once humans have been infected, the severity of the host response may be influenced by age. WEE tends to produce the most severe clinical infections in young persons.

Reference Values

IgG: <1:10
IgM: <1:10
Reference values apply to all ages.

Interpretation

In patients infected with this virus, IgG antibody is generally detectable within 1 to 3 weeks of onset, peaking within 1 to 2 months, and declining slowly thereafter.

IgM class antibody is also reliably detected within 1 to 3 weeks of onset, peaking and rapidly declining within 3 months.

Single serum specimen IgG greater than or equal to 1:10 indicates exposure to the virus.

Results from a single serum specimen can differentiate early (acute) infection from past infection with immunity if IgM is positive (suggests acute infection).

A 4-fold or greater rise in IgG antibody titer in acute and convalescent sera indicate recent infection.

In the United States, it is unusual for any patient to show positive reactions to more than 1 of the arboviral antigens, although Western equine encephalitis (WEE) and Eastern equine encephalitis antigens will show a noticeable cross-reactivity.

Infections with arboviruses can occur at any age. The age distribution depends on the degree of exposure to the particular transmitting arthropod relating to age and sex, as well as the occupational, vocational, and recreational habits of the individuals. Once humans have been infected, the severity of the host response may be influenced by age: WEE tends to produce the most severe clinical infections in young persons. Infection in male patients is primarily due to working conditions and sports activity taking place where the vector is present.

Cautions

All results must be correlated with the clinical history and other data available to the attending physician.

Specimens collected within the first 2 weeks after onset are variably negative for IgG antibody and should not be used to exclude the diagnosis of arboviral disease. If arboviral infection is suspected, a second specimen should be collected and tested 10 to 21 days later.

Eastern equine encephalitis and Western equine encephalitis viruses show some cross-reactivity; however, antibody response to the infecting virus is typically at least 8-fold higher.

Usually, when an infection with an arbovirus is suspected, it is too late to isolate the virus or collect serum specimens to detect a rise of antibody titer.

Clinical Reference

1. Gonzalez-Scarano F, Nathanson N: Bunyaviruses. In: Fields BN, Knipe DM, eds. Fields Virology. Vol 1. 2nd ed. Raven Press; 1990:1195-1228
2. Donat JF, Rhodes KH, Groover RV, Smith TF. Etiology and outcome in 42 children with acute nonbacterial meningoencephalitis. Mayo Clin Proc. 1980;55(3):156-160
3. Tsai TF. Arboviruses. In: Murray PR, Baron EJ, Pfaller MA, et al, eds. Manual of Clinical Microbiology. 7th ed. American Society for Microbiology; 1999:1107-1124
4. Calisher CH: Medically important arboviruses of the United States and Canada. Clin Microbiol Rev. 1994 Jan;7(1):89-116
5. Markoff L. Alphaviruses (Chikungunya, Eastern equine encephalitis). In: Bennett JE, Dolin R, Blaser MJ, eds. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 9th ed. Elsevier; 2020:1997-2006

Performance

Method Description

The indirect immunofluorescent antibody (IFA) assay is a 2-stage "sandwich" procedure. In the first stage, the patient serum is diluted in Pretreatment Diluent for IgM and phosphate buffered saline (PBS) for IgG, added to appropriate slide wells in contact with the substrate, and incubated. Following incubation, the slide is washed in PBS which removes unbound serum antibodies. In the second stage, each antigen well is overlaid with fluorescein-labeled antibody to IgM and IgG. The slide is incubated allowing antigen-antibody complexes to react with the fluorescein-labeled anti-IgM and anti-IgG. After the slide is washed, dried, and mounted, it is examined using fluorescence microscopy. Positive reactions appear as cells exhibiting bright apple-green cytoplasmic fluorescence against a background of red negative control cells. Semi-quantitative endpoint titers are obtained by testing serial dilutions of positive specimens.(Package insert: Arbovirus IFA IgM and Arbovirus IFA IgG Instructions for Use. Focus Diagnostics; Rev. 03 02/2023)

PDF Report

No

Day(s) Performed

(May through October) Monday through Friday
(November through April) Monday, Wednesday, Friday

Report Available

Same day/1 to 4 days

Specimen Retention Time

2 weeks

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

Test Definition: WEEP

Western Equine Encephalitis Antibody, IgG and IgM, Serum

86654 x 2

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
WEEP	West Equine Enceph Ab,IgG and IgM,S	69041-2

Result ID	Test Result Name	Result LOINC® Value
8193	West Equine Enceph Ab, IgG, S	6957-5
87279	West Equine Enceph Ab, IgM, S	In Process